Transmittal Letter to the United States 09/744485 Page 1
Designated/Elected Office (DO/EO/US) FORM PTO-1390

JC06 Rec'd PCT/PTO 24 JAN 2001

Docket No.	:	**HM-394PCT**
U.S. Application No.	:	
International Application No	:	**PCT/EP99/05113**
International Filing Date.	:	**July 17, 1999**
Priority Date Claimed	:	**July 24, 1998**
Title of Invention	:	**METHOD AND INSTALLATION FOR PRODUCING DUAL-PHASE STEEL**
Applicant(s) for (DO/EO/US)	:	**August Sprock**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. X This is a FIRST submission of items concerning a filing under 35 U S.C. 371
2. ___ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U S C. 371.
3. X This express request to begin national examination procedures 35 U.S.C 371 (f) at any time rather than delay examination until the expiration of the applicable time limit set forth in 35 U S C 371(b) and PCT Articles 22 and 39(1)
4. ___ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. X A copy of the International Application as filed [35 U.S.C. 371(c)(2)],
   a) X is transmitted herewith (required only if not transmitted by the International Bureau).
   b) ___ has been transmitted by the international Bureau.
   c) ___ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. X A translation of the International Application into English [35 U S C 371(c)(2)]
7. ___ Amendments to the claims of the International Application under PCT Article 19 [35 U S C.371(c)(3)]
   a) ___ are transmitted herewith (required only if not transmitted by the International Bureau).
   b) ___ have been transmitted by the International Bureau.
   c) ___ have not been made, however, the time limit for making such amendments has NOT expired
   d) ___ have not been made and will not be made.
8. ___ A translation of the amendments to the claims under PCT Article 19 [35 U S C 371(c)(3)].
9. X An oath or declaration of the inventor(s) [35 U.S.C.371(c)(4)] UNSINGED
10. ___ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 [35 U S C.371(c)(5)]

Items 11. to 16. below concern other document(s) or information included:

11. X An Information Disclosure Statement under 37 C F R 1 97 and 198
12. ___ An Assignment document for recording A separate cover sheet in compliance with 37 CFR 3 28 and 3 31 is included.
13. X A FIRST preliminary amendment.
    ___ A SECOND or SUBSEQUENT preliminary amendment
14. ___ A substitute specification
15. ___ A change of power of attorney and/or address letter
16. X (other items or information) **Two sheets of drawings, PTO-1449 w/ 6 references and International Search Report**

EXPRESS MAIL No.: **EL 670 216 359 US** Deposited: **January 24, 2001**

I hereby certify that this correspondence is being deposited with the United States Postal Service Express mail under 37 CFR 1 10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231.

Fr Kueffner

Friedrich Kueffner

January 24, 2001
Date

U.S. Application No (if known, see 37 C F R. 1.50) 09/744485
International Application No. : PCT/EP99/05113

Docket No. HM-394PCT

17. X The following fees are submitted:

BASIC NATIONAL FEE [37 CFR 1.492(a)(1)-(5)]:		CALCUL-ATIONS	PTO USE ONLY
X Search Report has been prepared by the EPO or JPO.	$ 860.00		
__ International preliminary examination fee paid to USPTO [37 CFR 1.482]	$ 690.00		
__ No International preliminary examination fee paid to USPTO [37 CFR 1.482] but International search fee paid to USPTO [37CFR 1 445(a)(2)	$ 710.00		
__ Neither International preliminary examination fee [37 CFR 1 482] nor International search fee [37 CFR 1.445(a)(2]) paid to USPTO	$ 1000.00		
__ International preliminary examination fee paid to USPTO [37 CFR 1 482] and all claims satisfied provisions of PCT Article 33 (2) to (4)	$ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT:		$ 860.00	
Surcharge of $ 130.00 for furnishing the oath or declaration later than __20 __30 months from the earliest claimed priority date [37 CFR 1 492(e)]		$	
Claims filed Extra Rate			
Total Claims 4 -20= x $ 18.=		$	
Indep. Claims 1 - 3= x $ 80.=		$	
Multiple Dependent Claims (if applicable) + $ 270 =		$	
TOTAL OF ABOVE CALCULATIONS:		$ 860.00	
Reduction by ½ for filing by small entity, if applicable Verified Small Entity Statement must be filed also. [Note 37 CFR 1.9,1.27, 1 28] (divided by 2)			
SUBTOTAL:		$ 860.00	
Processing fee of $ 130 00 for furnishing the English Translation later than __20 __30 months from the earliest claimed priority date [37 CFR 1 492(f)]		$	
TOTAL NATIONAL FEE:		$ 860.00	
Fee for recording the enclosed assignment [37 CFR 1.21(h)] The assignment must be accompanied by an appropriate cover sheet [37 CFR 3.28,3.31] $ 40.00 per property		$	
TOTAL FEES ENCLOSED:		$ 860.00	
AMOUNT TO BE REFUNDED:		Refunded	$
AMOUNT TO BE CHARGED:		Charged	$

a) X The above fee of **$ 860.00** is being charged as per attached form PTO-2038

b) _ Please charge my Deposit Account No. 11-1835 in the amount of $ to cover the above fees A duplicate copy of this sheet is enclosed

c) X The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **11-1835**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 36 CFR 1.494 or 1.495 has not been met, a petition to revive [37 CFR 1 137(a) or (b)] must be filed and granted to restore the application to pending status

SEND ALL CORRESPONDENCE TO: Friedrich Kueffner
342 Madison Avenue
Suite 1921
New York, NY 10173

Friedrich Kueffner	[signature]	29,482	January 24, 2001
Name	signature	Reg. No.	Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

HM-394PCT

Applicant(s)	:	August Sprock
Serial No.	:	NOT YET KNOWN (PCT/EP99/05113)
Int. Filed	:	July 17, 1999
For	:	METHOD AND INSTALLATION FOR PRODUCING DUAL-PHASE STEEL

Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

S I R:

In advance of the first office action, please amend the claims as follows:

IN THE CLAIMS

Claim 2, line 1, change "characterized in that" to --wherein--.

Claim 3, line 1, change "one or several" to --claim 1,--;
line 2, delete "of the preceding claims,";
line 3, change "characterized by" to --wherein--.

Claim 4, line 1, change "characterized in that" to --wherein--.

REMARKS

Claims 1 - 4 are in the application.

As a result of the foregoing amendment, the claims have been amended to remove improper claim language.

Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 11-1835.

Respectfully submitted,

Friedrich Kueffner
Reg. No. 29,482

FK:ml
January 24, 2001
342 Madison Avenue
New York, NY 10173
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EXPRESS MAIL No.: **EL 670 216 359 US** Deposited: **January 24, 2001**

I hereby certify that this correspondence is being deposited with the United States Postal Service Express mail under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231.

Friedrich Kueffner

2/PRB

09/744485

500 Rec'd PCT/PTO 24 JAN 2001

Translation of WO 00/05422 (PCT/EP99/05113)

Method and Installation for Producing Dual-Phase Steel

The invention relates to a method and a device for producing dual-phase steel with a two-phase microstructure of 70 to 90 % ferrite and 30 to 10 % martensite from the hot-rolled state by a controlled temperature guiding and defined cooling strategy during the cooling of the steels, inter alia by means of water cooling after their finish rolling, wherein in a first cooling stage the cooling curve enters the ferrite region and, after reaching the required ferrite contents, further cooling to temperatures below the martensite starting temperature is carried out in a second cooling stage.

The targeted structural transformation by a corresponding cooling of the steels is known. For example, in DE 44 16 752 A1 a method for generating hot wide strip is described in which, before the first transformation, between the continuous casting device and a compensation furnace, the surface temperature of the slab is reduced to a sufficient depth (at least 2 mm) so that a structural transformation from austenite to ferrite/pearlite is achieved. In this context, the cooling time is selected such that at least 70 % austenite is transformed into ferrite/pearlite. A renewed transformation into austenite with new orientation of the austenite grain boundaries is carried out subsequently in the compensation furnace. In this way, it is to be achieved that even scrap metal of second quality, in particular, scrap metal with copper contents, can be used as a raw material without undesirable accumulations of copper on the grain boundaries of the primary austenite.

When manufacturing dual-phase steels, one takes also advantage of an occurring structural transformation by means of a targeted cooling, but now temporally after the transformation has occurred. The adjustment of a dual-phase microstructure depends in this connection significantly on the cooling speeds made possible by the device technology and on the steel composition. Important for the manufacture of dual-phase steels is a sufficient ferrite formation in the first cooling stage.

With respect to device technology, a sufficient ferrite formation is achieved, for example, by cooling with water to a temperature of approximately 620 - 650 °C with subsequent air cooling. The duration of air cooling (approximately 8 seconds) is selected such that at least 70 % of the austenite is transformed into ferrite before the second cooling stage begins. A transformation into the pearlite stage should be avoided during the first cooling stage as well as during air cooling.

In the second cooling stage there must still be so much cooling capacity present that hasp temperatures below the martensite starting temperature are achieved. Only then the formation of a dual-phase microstructure with ferrite and martensite components is ensured. This known manufacture presents no problem for small strip speeds because sufficient cooling capacities for the martensite transformation are available at the end of the first cooling stage.

For very high strip speeds, however, the beginning of the second cooling stage can be displaced within the current cooling stretch to such an extent that the subsequent martensite formation occurs

only incompletely or not at all because then the cooling capacity for adjustment of the required low-temperature (< 220° C) is no longer sufficient. A mixed microstructure of ferrite, bainite and proportions of martensite will result that cannot fulfill the desired mechanical properties of a pure dual-phase microstructure.

Based on this known prior art, it is an object of the invention to provide a method and a device for producing dual-phase steel wherein a fast and quantitatively sufficient structural transformation of the austenite into ferrite is possible even at high strip speeds.

The above object is solved according to the invention with the characterizing measures of claim 1 in that during the first cooling stage the cooling curve of the steels is adjusted with such a low cooling speed of 20 K/s to 30 K/s that the cooling curve enters the ferrite region with a temperature still so high that the ferrite formation can take place quickly and that already at least 70 % of the austenite has been transformed into ferrite before the beginning of the second cooling stage.

With the inventively slower cooling with a cooling speed lower than in known methods, the cooling curve enters the ferrite region temporally later but at a higher temperature than in the known methods, i.e., the transformation of the austenite into ferrite begins slightly delayed but at a higher temperature than in the known methods and it occurs also faster as a result of the higher temperature. It is especially beneficial when the ferrite region is reached as quickly as possible while at the same time the transformation temperature is high.

In comparison to the known methods, a degree of transformation of at least 70 % is reached so early that there is sufficient cooling capacity in a given cooling stretch for the subsequent martensite formation. This means that at the end of the first cooling stage a sufficiently large quantity of austenite has been transformed into ferrite so that the conventionally performed air cooling can be eliminated and the second cooling stage can follow immediately after the first cooling stage.

In order to perform the cooling with the desired low cooling speed, the principle of a dispersed cooling is applied according to the invention. This is a water cooling process in which water is applied to the goods to be cooled by water cooling stages arranged successively at a spacing. By adjusting the number of the water cooling stages, their spacing from one another, as well as the effective length of the water cooling stages, the cooling speed as well as the applied water quantity can be optimally adjusted to the goods to be cooled (the mass of the goods to be cooled and/or the surface of the goods to be cooled). The cooling can also be realized by a cooling medium quantity that can be adjusted continuously.

As a result of the adjustment to the goods to be cooled, the dispersed cooling can be temporally expanded until the desired degree of transformation has been reached without there being the risk that, as in the known methods of fast cooling, the cooling curve leaves the ferrite region already beforehand as a result of cooling that is too intensive.

In comparison to cooling according to the prior art, by means of a dispersed cooling or cooling with a continuously adjustable cooling medium quantity, less water is applied until the transformation temperature is reached. This differential water quantity can now be applied during the transformation in order to force the carbon separation from the ferrite into the residual austenite and to thereby accelerate the ferrite formation. The residual austenite regions are enriched with carbon to such an extent that they transform into martensite already at cooling speeds of 20 - 30 K/s.

Since a defined holding period for the cooling in air is no longer needed in order to ensure a sufficient ferrite formation, the production of dual-phase steels can be realized on a portion of the cooling stretch. In this connection, the employed portion of the cooling stretch is very much shorter than in known methods with air cooling.

When the required microstructure components for dual-phase steels can be adjusted without air cooling, this results in significant advantages for the operator. Fewer device components are required for the production of dual-phase steels. At the same time, the production spectrum can be broadened in comparison to the prior art with changed process and strip parameters (for example, higher strip speed).

A device for performing the method of the invention is characterized by a cooling stretch arranged behind the last finishing roll stand and comprised of several water cooling stages positioned successively at a spacing or cooling systems with a continuously adjustable cooling medium quantity. The number of

water cooling stages, their effective length and their spacing from one another are changeable according to the invention so that this cooling stretch can be adapted in a simple way to changing geometries of the goods to be cooled as well as to different strip speeds.

Further advantages, details, and features of the invention result from the following description of an embodiment schematically illustrated in the drawings.

It is shown in:

Fig. 1 a schematic illustration of the fast cooling and the dispersed cooling as well as their arrangement in a mill train;

Fig. 2 a time-temperature-transformation curve;

Fig. 3 the degree of austenite transformation for fast transformation;

Fig. 4 the degree of austenite transformation for dispersed cooling.

In Fig. 1 the end of a mill train is schematically illustrated. It is comprised of the last finish roll stand (1), the rolling stock or goods to be cooled (2), and a hasp (3) with deflection rolls or drivers (4). Above this part of a mill train two different cooling stretches are shown. With the cooling stretch (5) according to the prior art an early, fast cooling of the goods to be cooled (2) is

realized by a continuous water supply. In the cooling stretch (6) according to the invention water cooling stages (7) are arranged successively at a spacing so that the cooling is "dispersed".

The different transformation results caused by the different cooling methods (5, 6) are represented in an exemplary fashion in the following schematic illustrations.

In Fig. 2, a time-temperature-transformation curve of the course of the cooling curve (9) for cooling according to known methods and the cooling curve (10) for a dispersed cooling are illustrated, wherein on the abscissa the time (Z) in seconds and on the ordinate the temperature (T) in °C are indicated.

The cooling curve (9) shows the cooling course for the strategy conventionally employed nowadays (early, fast cooling to a certain holding temperature with subsequent air cooling, followed by further cooling to lower temperatures below the martensite starting temperature). The first cooling stage (11) of the cooling curve reaches relatively early the transformation region for the ferrite formation (F = ferrite region) at the point (8) and also remains in this region (F) for a relatively long time as a result of the holding time (12) with air cooling before a further cooling to a temperature below the martensite starting temperature (M = martensite, B = bainite, P = pearlite) takes place by means of the second cooling stage (13) starting at the point (17).

In contrast, with the dispersed cooling the cooling curve (10) with its first cooling stage (14) reaches the ferrite region (F) at the point (15) later in comparison to the cooling curve (9). Since

after reaching the ferrite region (F) the dispersed cooling is initially maintained, no time-consuming waiting period with air cooling is required, and the cooling curve (10) leaves the ferrite region (F) earlier.

The dispersed cooling is maintained within the ferrite region (F) until the desired degree of transformation has been reached. The further cooling by means of the second cooling stage (16) is carried out directly thereafter.

The austenite transformation rates which can be achieved with the described different cooling strategies, i.e., the known fast cooling and the dispersed cooling, can be seen in the two next illustrations of Figs. 3 and 4. The cooling time (Z) in seconds and the degree of transformation (U) of the austenite transformation into ferrite are illustrated on the abscissa and on the ordinate, respectively.

In the fast cooling (Fig. 3), during the first cooling stage (11) of the cooling curve (9) first a strong ferrite formation up to approximately 53 % takes place which then increases during the following air cooling (12) to approximately 62 %. However, this is not sufficient for the production of dual-phase steels.

In contrast thereto, with the dispersed cooling (Fig. 4) according to cooling curve (10) a considerably higher ferrite contents has already been formed in the first cooling stage (14) in the same time period and approximately 82 % austenite has already been transformed into ferrite before the second cooling stage (16)

occurs (the dual-phase steels produced nowadays have generally a contents of > 80 % ferrite).

The invention is not limited to the exemplary cooling curves described in the illustrations; other cooling curves as, for example, in cooling systems with a continuously changing cooling medium quantity are possible which, in keeping with the invention, result in higher transformation temperatures. Also, the invention is not limited to water cooling; other cooling systems can also be employed which lead to an earlier reaching of the ferrite region at high temperatures.

Claims

1. Method for producing dual-phase steels with a two-phase microstructure of 70 to 90 % ferrite and 30 to 10 % martensite from the hot-rolled state by a controlled temperature guiding and defined cooling strategy during the cooling of the steels, inter alia by means of water cooling after their finish rolling, wherein in a first cooling stage the cooling curve enters the ferrite region and, after reaching the required ferrite contents, a further cooling in a second cooling stage to temperatures below the martensite starting temperature, is carried out, characterized in that during the first cooling stage (14) the cooling curve (10) of the steels is suggested with such a low cooling speed of 20 K/s to 30 K/s that the cooling curve (10) enters the ferrite region with such a high temperature that the ferrite formation can take place quickly and that before begin of the second cooling stage (16) already at least 70 % of the austenite is transformed to ferrite.

2. Method according to claim 1, characterized in that the second cooling stage (16) immediately follows the first cooling stage (14) without intermediate air cooling and holding time.

3. Method according to claim 1 or 2, characterized in that the cooling is realized during the first cooling stage (14) by a dispersed cooling with the aid of water cooling stages (7) arranged successively at a spacing or with cooling systems with a continuously changeable cooling medium quantity.

4. Method according to claim 3, characterized in that the dispersed cooling is continued during the transformation of the austenite into ferrite up to the desired ferrite contents of at least 70 %.

5. Device for performing the method according to one or several of the preceding claims, for producing dual-phase steels from the hot-rolled state, characterized by a cooling stretch (6) arranged behind the last finish roll stand (1) and having water cooling stages (7) positioned successively at a spacing or having cooling systems with a continuously adjustable cooling medium quantity.

6. Device according to claim 5, characterized in that the number of water cooling stages (7), their effective length, and their spacing from one another are changeable or continuously adjustable in the case of quantity control.

Translation of Amended Pages 2, 2a and Claims 1-4 of WO 00/05422 (PCT/EP99/05113)

of a dual-phase microstructure depends in this connection significantly on the cooling speeds made possible by the device technology and on the steel composition. Important for the manufacture of dual-phase steels is a sufficient ferrite formation in the first cooling stage.

With respect to device technology, a sufficient ferrite formation is achieved, for example, by cooling with water to a temperature of approximately 620 - 650 °C with subsequent air cooling. The duration of air cooling (approximately 8 seconds) is selected such that at least 70 % of the austenite is transformed into ferrite before the second cooling stage begins. A transformation into the pearlite stage should be avoided during the first cooling stage as well as during air cooling.

In the second cooling stage there must still be so much cooling capacity present that hasp temperatures below the martensite starting temperature are achieved. Only then the formation of a dual-phase microstructure with ferrite and martensite components is ensured. This known manufacture presents no problem for small strip speeds because sufficient cooling capacities for the martensite transformation are available at the end of the first cooling stage.

For very high strip speeds, however, the beginning of the second cooling stage can be displaced within the current cooling stretch to such an extent that the subsequent martensite formation occurs

only incompletely or not at all because then the cooling capacity for adjustment of the required low-temperature (< 220° C) is no longer sufficient. A mixed microstructure of ferrite, bainite and proportions of martensite will result that cannot fulfill the desired mechanical properties of a pure dual-phase microstructure.

From EP-A-0 747 495 a method for manufacture of hot-rolled steel sheet is known whose structure comprises at least 75 % ferrite and at least 10 % martensite. For its manufacture, the steel is cooled in a targeted fashion after hot-rolling, in particular, in a first cooling stage with a cooling rate of 2 to 15°C/s within a time period of 8 to 40 seconds to a temperature between Ar_1 point and 730°C and thereafter in a second cooling stage with a cooling rate of 20 to 150° per second to a temperature of 300°C. As an alternative, a quick cooling with a cooling rate of 20 to 150°C/s is used before the first cooling stage that leads to a temperature below the Ar_3 point.

From the printed publication Patent Abstracts of Japan vol. 006, No. 191(C-127), 30 September 1982, and JP 57 104650 A (Kobe Steel Ltd.), 29 June 1982, a method for manufacturing a hot-rolled steel sheet comprised of ferrite and a proportion of 1 to 30 % martensite is known which is also generated by a two-stage cooling. According to this method, cooling is carried out slowly to a temperature between the Ar_1 point and 550°C at a cooling rate of 5 to 30°C/second and, subsequently, cooling is carried out with a fast cooling rate of > 30°C/s to a temperature in the range of 350 to 500°C in a second cooling stage.

Based on this known prior art, it is an object of the invention to provide a method and a device for producing dual-phase

Claims

1. Method for producing dual-phase steels from the hot-rolled state with a two-phase microstructure of 70 to 90 % ferrite and 30 to 10 % martensite by a controlled temperature guiding and defined cooling strategy during the cooling of the steels, inter alia by means of water cooling after their finish rolling, wherein in a first cooling stage at a cooling rate of < 30 K/s the cooling curve enters the ferrite region and, after reaching the required ferrite contents, further cooling is carried out in a second cooling stage at a cooling rate of > 30 K/s to temperatures below the martensite starting temperature, characterized in that

   a) the first cooling stage (14) is carried out in a cooling stretch of water cooling stages (7), arranged successively at a spacing, or in a cooling system with continuously changeable cooling medium quantity with a cooling rate of 30 K/s adjusted such

   b) that the cooling curve (10) enters the ferrite region a temperature still so high that the ferrite formation can take place quickly; and,

   c) before begin of the second cooling stage (16), which follows without intermediate air cooling and holding time directly after the first cooling stage (14), already at least 70 % of the austenite is transformed to ferrite.

2. Method according to claim 1, characterized in that the cooling of the first cooling stage is continued during the transformation of the austenite into ferrite up to the desired ferrite contents of at least 70 %.

3. Device for performing the method according to one or several of the preceding claims, for producing dual-phase steels from the hot-rolled state, characterized by a cooling stretch (6) arranged behind the last finish roll stand (1) and having several water cooling stages (7) positioned successively at a spacing or having cooling systems with a continuously adjustable cooling medium quantity.

4. Device according to claim 3, characterized in that the number of water cooling stages (7), their effective length, and their spacing from one another are changeable or continuously adjustable in the case of quantity control.

FIG.1

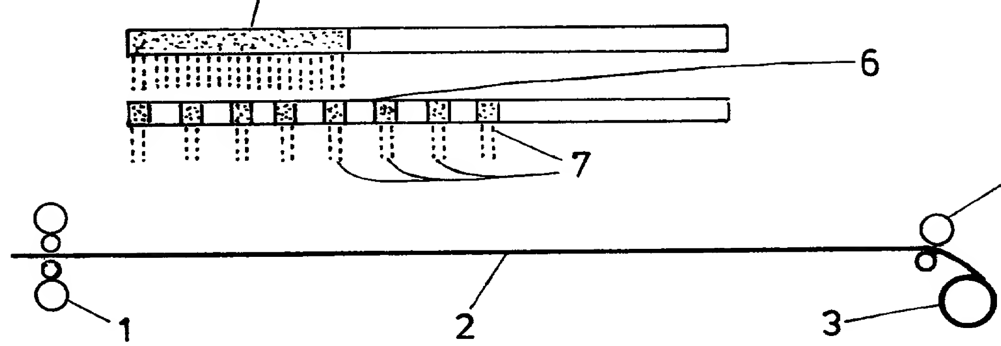


FIG.2

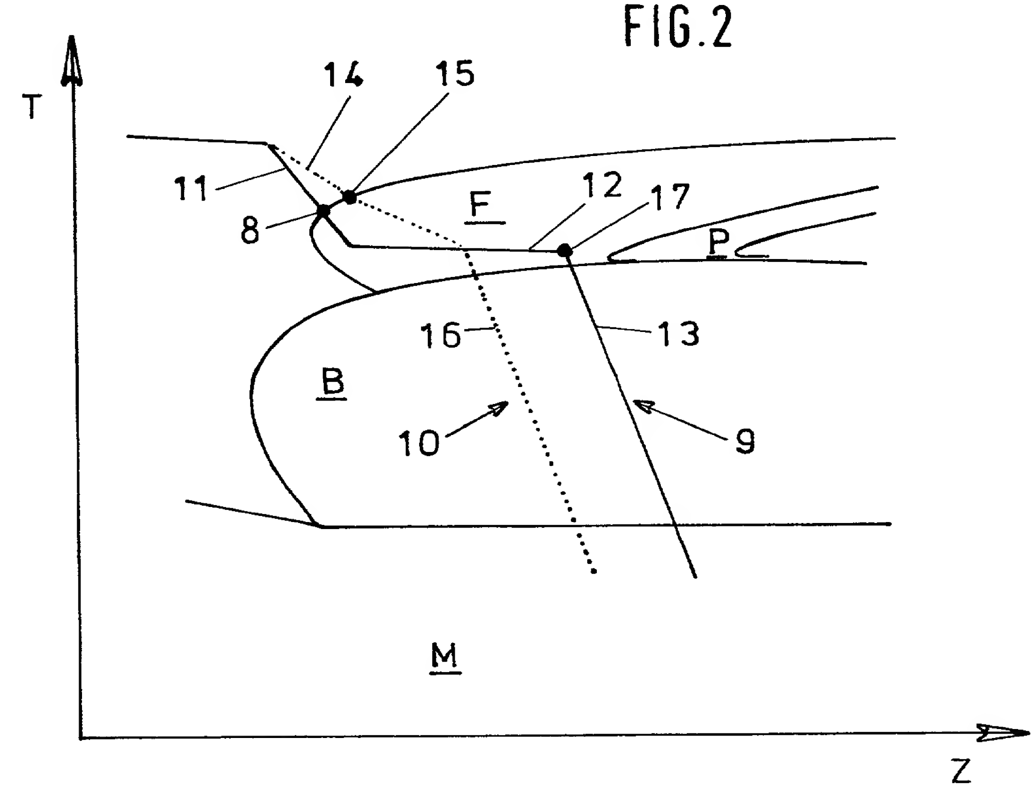
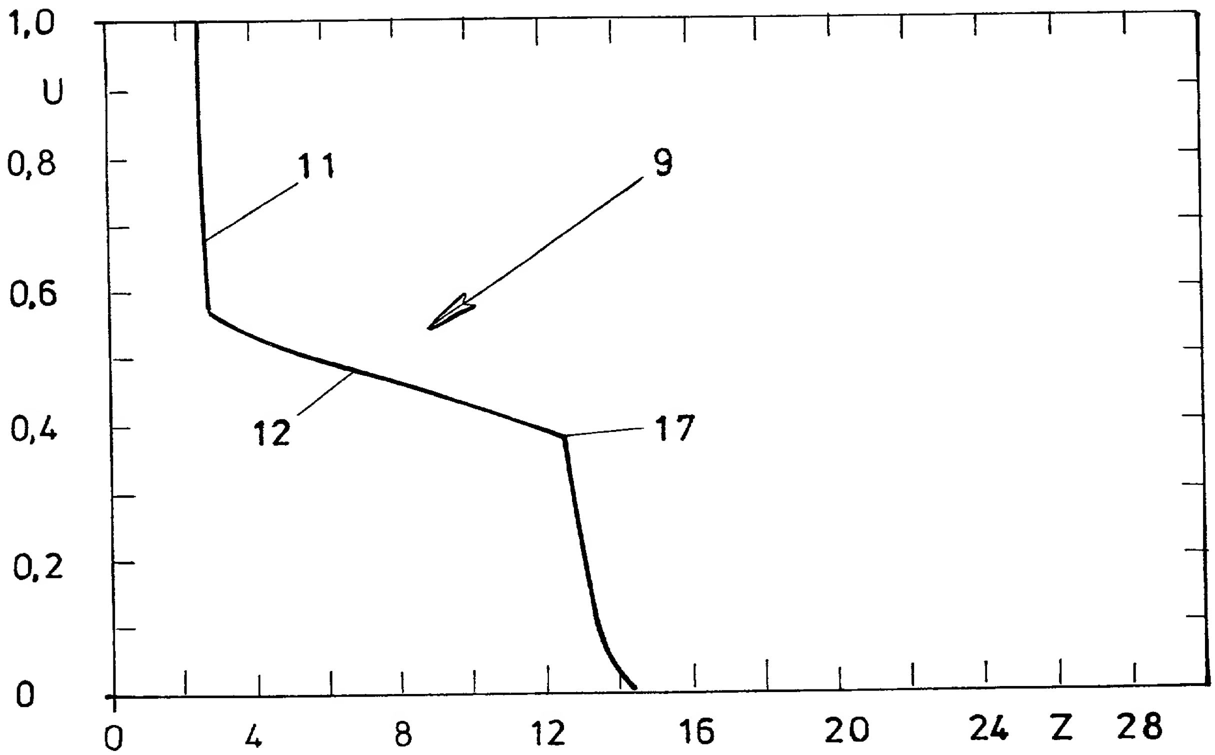


FIG.3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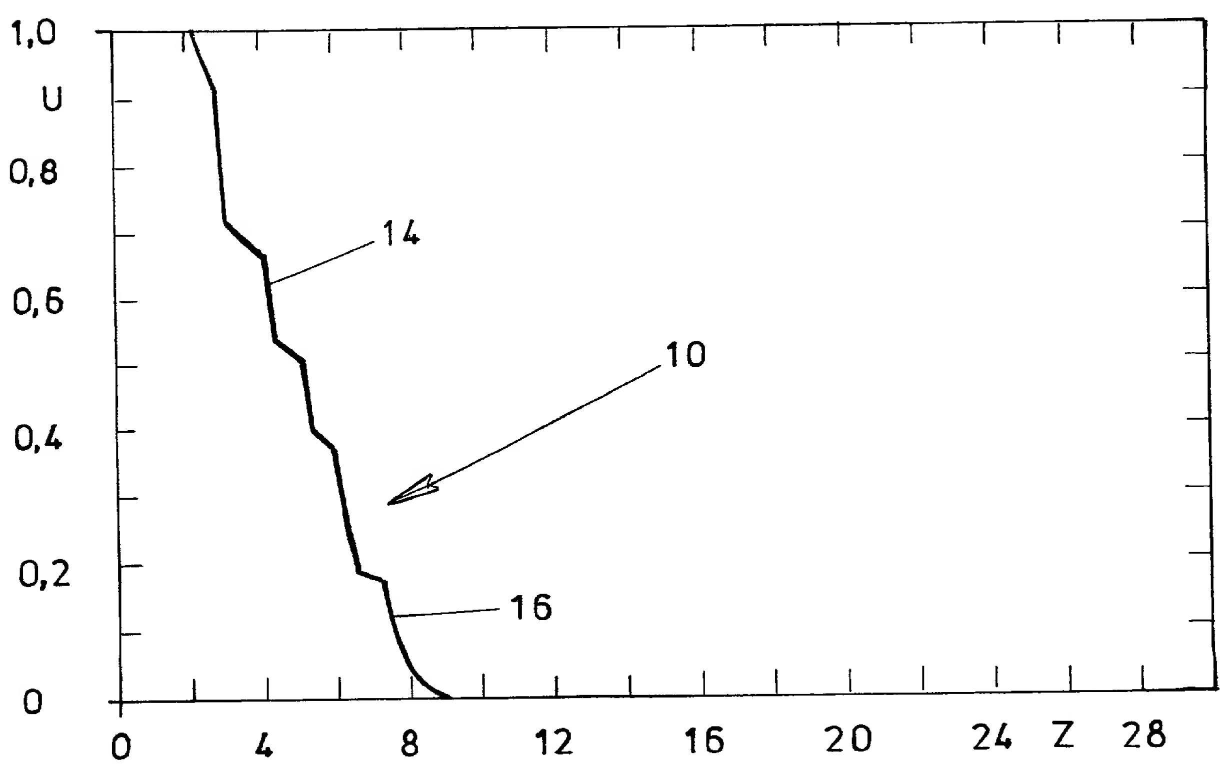
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FIG.4

Rec'd PCT/PTO 12 MAR 2001

COMBINED DECLARATION FOR PARENT APPLICATION AND POWER OF ATTORNEY *(includes Reference to PCT International Applications)*	Attorney's Docket No. **HM-394**

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **METHOD AND INSTALLATION FOR PRODUCING DUAL-PHASE STEEL**

the specification of which (check only one item below):

[ ] is attached hereto.

[ ] was filed as United States application

Serial No. ______
on ______,
and was amended
on ______ (if applicable).

[X] was filed as PCT international application

Number **PCT/EP99/05113**
on **July 17, 1999**,
and was amended under PCT Article 19
on ______ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY *(if PCT, indicate PCT)*	APPLICATION NUMBER	DATE OF FILING *(day, month, year)*	PRIORITY CLAIMED UNDER 35 USC 119
GERMANY	**198 33 321.8**	**24 July 1998**	[X] YES [ ] NO
			[ ] YES [ ] NO

PTO-1391 (REV. 10-83)

U.S. DEPARTMENT OF COMMERCE - Patent and Trademark Office

Combined Declaration For Parent Application and Power of Attorney (Continued) *(includes Reference to PCT International Applications)*	Docket No. **HM-394**

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of the application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty of disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application(s) and the national or PCT internation filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS			STATUS(*CHECK ONE*)		
U.S. APPLICATION NUMBER	U.S. FILING DATE		PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NO.			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(List name and registration number)*

FRIEDRICH KUEFFNER, REG. NO. 29,482

Send Correspondence to:	Direct Telephone Calls to:
FRIEDRICH KUEFFNER **342 MADISON AVENUE, SUITE 1921** **NEW YORK, N.Y. 10173**	**FRIEDRICH KUEFFNER** ***(212) 986-3114***

2	FULL NAME OF INVENTOR	*Family Name* **Sprock**	*First Given Name* **August**	*Second Given Name*
0	RESIDENCE & CITIZENSHIP	*City* **Siegen**	*State Or Foreign Country* **Germany** DEX	*Citizenship* **Germany**
1	POST OFFICE ADDRESS	*Post Office Address* **Marburger Tor 18**	*City* **57072 Siegen**	*State & Zip Code* **Germany**

Combined Declaration For Parent Application and Power of Attorney (Continued) *(includes Reference to PCT International Applications)*	Docket No. **HM-394**

202	FULL NAME OF INVENTOR	*Family Name*	*First Given Name*	*Second Given Name*
	RESIDENCE & CITIZENSHIP	*City*	*State Or Foreign Country*	*Citizenship*
	POST OFFICE ADDRESS	*Post Office Address*	*City*	*State & Zip Code*

203	FULL NAME OF INVENTOR	*Family Name*	*First Given Name*	*Second Given Name*
	RESIDENCE & CITIZENSHIP	*City*	*State Or Foreign Country*	*Citizenship*
	POST OFFICE ADDRESS	*Post Office Address*	*City*	*State & Zip Code*

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE OF INVENTOR 201	*SIGNATURE OF INVENTOR 202*	*SIGNATURE OF INVENTOR 203*
A. [signature]		
DATE 20.2.2001	*DATE*	*DATE*

PTO-1391 (REV. 10-83)

U.S. DEPARTMENT OF COMMERCE - Patent and Trademark Office

COMBINED DECLARATION FOR PARENT APPLICATION AND POWER OF ATTORNEY *(includes Reference to PCT International Applications)*	Attorney's Docket No. **HM-394**

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **METHOD AND INSTALLATION FOR PRODUCING DUAL-PHASE STEEL**

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No. ____________________
on ____________________,
and was amended
on ____________________ (if applicable).

☒ was filed as PCT international application

Number **PCT/EP99/05113**
on **July 17, 1999**,
and was amended under PCT Article 19
on ____________________ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY *(if PCT, indicate PCT)*	APPLICATION NUMBER	DATE OF FILING *(day, month, year)*	PRIORITY CLAIMED UNDER 35 USC 119
GERMANY	**198 33 321.8**	**24 July 1998**	☒ YES ☐ NO
			☐ YES ☐ NO

PTO-1391 (REV. 10-83)

U.S. DEPARTMENT OF COMMERCE - Patent and Trademark Office

Combined Declaration For Parent Application and Power of Attorney (Continued) *(includes Reference to PCT International Applications)*	Docket No. **HM-394**

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of the application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty of disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application(s) and the national or PCT internation filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		**STATUS *(CHECK ONE)***		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NO.			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(List name and registration number)*

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